Inelastic Collisions of a Fermi Gas in the BEC-BCS Crossover regime

YINGYI ZHANG, XU DU, JOHN THOMAS, Duke University — We measure inelastic collisions of a Fermi gas of $^6$Li in the BEC-BCS crossover regime. We load the ultracold atoms of $^6$Li into a CO$_2$ laser standing wave, forming a two dimensional Fermi gas. Atomic density in the 2-D system is 20 times higher than that in a 3-D Fermi gas, which leads to a significant increase in atom loss. At energy $E/E_F \approx 1.8$, data shows a dominant three-body decay process. We measure the magnetic field dependence of the three-body inelastic collision coefficients. At $E/E_F \approx 0.7$, data shows coexistence of two-body and three-body decay processes on and below the Feshbach resonance. We suggest the two-body decay may involve pairs of atoms and determine the two-body inelastic collision coefficients.